WHAT IS CLAIMED IS:

1. An optical disk reproducing apparatus reproducing information from an optical disk having information recorded by formation of a string of a plurality of pits having at least two different depths, by irradiation of an optical beam, comprising:

a photoreceptor element detecting a quantity of reflected light of said optical beam from said optical disk;

a pit depth detecting unit detecting a depth of each pit formed on said optical disk, based on the quantity of reflected light detected by said photoreceptor element;

a servo signal generating unit, generating a tracking servo signal allowing said optical beam to track said pit string, by detecting deviation between said optical beam and said pit string, based on the quantity of reflected light detected by said photoreceptor element; and

an output control unit controlling an output of the tracking servo signal generated by said servo signal generating unit, based on the result of detection by said pit depth detecting unit.

2. The optical disk reproducing apparatus according to claim 1, wherein

said output control unit supplies the tracking servo signal generated by said servo signal generating unit for tracking by said optical beam, when a pit having such depth that is to be reproduced is being tracked, and holds and supplies for tracking by said optical beam the tracking servo signal generated at the time of tracking of said pit having the depth to be reproduced, when a pit of a different depth is being tracked, based on the result of detection by said pit depth detecting unit.

3. The optical disk reproducing apparatus according to claim 1, wherein

said pit depth detecting unit detects depth of each pit, based on a difference in the quantity of reflected light from said pit string along

tangential direction.

4. The optical disk reproducing apparatus according to claim 3, wherein

said pit depth detecting unit includes

a first detecting unit generating a first signal representing the quantity of reflected light from said pit string,

a second detecting unit generating a second signal indicative of the difference of the quantity of reflected light from said pit string along the tangential direction, and

a third detecting unit generating a third signal indicative of depth of each pit, based on said first and second signals.

5. The optical disk reproducing apparatus according to claim 4, wherein

said third detecting unit includes

a first comparing circuit comparing said second signal with a first reference value,

a second comparing circuit comparing said second signal with a second reference value, and

a holding circuit holding results of comparison by said first and second comparing circuits, at a time point of change of said first signal.

6. The optical disk reproducing apparatus according to claim 1, wherein

said servo signal generating unit generates said tracking servo signal, by detecting a phase difference in the quantity of reflected light detected by said photoreceptor element.

7. The optical disk reproducing apparatus according to claim 1, wherein

said servo signal generating unit generates said tracking servo signal, by detecting a difference in the quantity of reflected light detected by

said photoreceptor element from an inner peripheral side and an outer peripheral side of said optical disk.

8. The optical disk reproducing apparatus according to claim 1, wherein

said photoreceptor element has a cross-shape, divided into two along the tangential direction and divided into two along the radial direction of said optical disk.

9. The optical disk reproducing apparatus according to claim 1, wherein

said photoreceptor element is divided into two along the tangential direction of said optical disk, one of the two-split photoreceptor element is further divided into two along the tangential direction of said optical disk, and the other is further divided into two along the radial direction of said optical disk.

10. An optical disk having a track including a plurality of recessed and protruded portions formed thereon, from which information is reproduced by optical beam irradiation, the recessed and protruded portions existing mixedly such that a signal indicative of a deviation between said optical beam and said track is detected with different polarity at each of the recessed and protruded portions, wherein

ratio of mixture of said recessed and protruded portions is set such that a tracking servo signal, obtained by time-averaging said detected signal in a time period shorter than a response time of tracking servo when said optical beam tracks said track, has one of said different polarities.

11. The optical disk according to claim 10, wherein
said formed recessed and protruded portions are pits.

12. The optical disk according to claim 10, wherein
said formed recessed and protruded portions include a recording

mark.

13. The optical disk according to claim 10, wherein said formed recessed and protruded portions include a groove and/or a land.

14. The optical disk according to claim 10, wherein

said detected signal is a signal detected based on a phase difference in the quantity of light reflected from said recessed and protruded portions of said optical beam.

15. The optical disk according to claim 10, wherein

said detected signal is a signal detected based on a difference in the quantity of light reflected from said recessed and protruded portions of said optical beam between an inner peripheral side and an outer peripheral side of said optical disk.

16. A optical disk reproducing apparatus reproducing information from an optical disk having information recorded by formation of a track formed of a plurality of recessed and protruded portions, by an optical beam irradiation, comprising:

a photoreceptor element detecting a quantity of reflected light of said optical beam from said optical disk;

a signal detecting unit detecting a signal indicative of a deviation between said optical beam and said track, based on the quantity of reflected light detected by said photodetector element, said optical disk having recessed and protruded portions existing mixedly, from which said signal is detected with the polarity being different in each of the recessed and protruded portions;

a servo signal generating unit generating a tracking servo signal by time-averaging said detected signal in a time period shorter than a response time of tracking servo when said optical beam tracks said track, ratio of mixture of said recessed and protruded portions being set such that said generated tracking servo signal has one of said different polarities; and

a gain changing unit changing gain of the tracking servo, in accordance with magnitude of said generated tracking servo signal.

17. The optical disk reproducing apparatus according to claim 16, wherein

the recessed and protruded portions formed on said optical disk are pits.

18. The optical disk reproducing apparatus according to claim16, wherein

the recessed and protruded portions formed on said optical disk includes a recording mark.

19. The optical disk reproducing apparatus according to claim 16, wherein the recessed and protruded portions formed on said optical disk includes a groove and/or a land.

20. The optical disk reproducing apparatus according to claim 16, wherein

said signal detecting unit detects said signal based on a phase difference in the quantity of light reflected from said recessed and protruded portions of said optical beam.

21. The optical disk reproducing apparatus according to claim 16, wherein

said signal detecting unit detects said signal based on a difference in the quantity of light reflected from said recessed and protruded portions of said optical beam between an inner peripheral side and an outer peripheral side of said optical disk.

22. A method of tracking an optical disk having a track including a plurality of recessed and protruded portions formed thereon, from which information is reproduced by optical beam irradiation, comprising the steps

of:

detecting a quantity of reflected light of said optical beam from said optical disk;

detecting a signal indicative of a deviation between said optical beam and said track, based on said detected quantity of reflected light, wherein said optical disk includes recessed and protruded portions existing mixedly from which said signal is detected with the polarity being different in each of said recessed and protruded portions;

generating a tracking servo signal by time-averaging said detected signal in a time period shorter than a response time of tracking servo when said optical beam tracks said track, wherein ratio of mixture of said recessed and protruded portions is set such that said generated tracking servo signal has one of said different polarities; and

changing gain of the tracking servo in accordance with magnitude of said generated tracking servo signal.

23. The method according to claim 22, wherein

the recessed and protruded portions generated on said optical disk are pits.

24. The method according to claim 22, wherein

the recessed and protruded portions formed on said optical disk includes a recording mark.

25. The method according to claim 22, wherein the recessed and protruded portions formed on said optical disk includes a groove and/or a land.

26. The method according to claim 22, wherein

in said step of detecting said signal, said signal is detected based on a phase difference in the quantity of light reflected from said recessed and protruded portions of said optical beam.

27. The method according to claim 22, wherein

in said step of detecting said signal, said signal is detected based on a difference in the quantity of light reflected from said recessed and protruded portions of said optical beam between an inner peripheral side and an outer peripheral side of said disk.